

EPA Superfund

Explanation of Significant Differences:

MINOT LANDFILL
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ADMINISTRATIVE RECORD

April 10, 1996

Old Minot Landfill Superfund Site

EXPLANATION OF SIGNIFICANT DIFFERENCES

Overview

The Old Minot Landfill Superfund Site (Site) is a closed waste disposal facility located in Section 27, Township 155 North, Range 83 West, approximately one mile southwest of downtown Minot, in Ward County, North Dakota. The site is situated approximately 2,000 feet south of the Souris River and is located to the east of the intersection of the Burdick Expressway and the combined U.S. Highways 2 and 52 Bypass. The fill area that received municipal and industrial waste covers approximately 17 acres. Land use in the vicinity of the Site is light industrial and residential, with areas southwest of the Site used for agriculture. Figure 1 shows the Site location. Figure 2 details the landfill itself.

The Site was placed on the National Priorities List (NPL) in 1989.

Residential, commercial, recreational, and agricultural areas are currently located in the vicinity of the Site, and nearly a quarter (8,000) of Minot's population lies within a one-mile radius of the Site. Since the latter part of 1989, most of the Site has been enclosed with a chain-link fence and, consequently, public access to the Site is presently restricted. Future land use for the areas adjacent to the Site is expected to be commercial and light industrial. A Baseline Risk Assessment (BRA) was prepared for the Site to evaluate potential human health risks associated with the Site in absence of any remedial action. Contaminated media that were quantitatively evaluated in the risk assessment were: groundwater (including leachate), surface water, soil, sediment, and landfill gases. Potentially exposed receptors who were evaluated in the BRA were: (1) adult residents and occupational workers who live or work at or in the vicinity of the Site, and (2) active children between the ages of 3 to 12 years who live or play in the vicinity of the Site.

Once the contamination at the Site was characterized, an evaluation was made to determine the types of removal and/or remedial measures that would be applicable to achieve specified cleanup goals. This evaluation and cleanup goals are contained in the Site Feasibility Study (FS), prepared by the City of Minot's consultant. Additionally, a geophysical survey investigation to further define horizontal and vertical extents of the fill area was completed by the City of Minot's consultant (May 1993).

Upon completion of the Remedial Investigation/Feasibility Study (RI/FS) for the Site, EPA issued a Record of Decision (ROD) for the Site on June 21, 1993. This ROD did not recognize results of the geophysical survey investigation (May 1993).

THE OBJECTIVES OF THE ROD

The ROD addresses the potential threats to humans and the environment resulting from future migration of leachate and gas emissions from the Site. Specific elements that the response action will address in eliminating or mitigating the potential threats include: (1) the landfill must have a cap that is adequate to prevent direct contact by receptors with the waste or leachate; (2) the leachate levels in the landfill must be managed to prevent leachate seeps through the cap and to reduce the potential for leachate migration from the landfill to the groundwater; (3) the landfill gas must be controlled to reduce pressures in the landfill that can damage the landfill cap and can increase the potential for leachate migration; (4) institutional controls must be implemented to prohibit any human activity on the landfill that would expose receptors to refuse or leachate, or that would damage the containment system; and (5) groundwater in the vicinity of the landfill must be sampled and analyzed at regular intervals to demonstrate that the selected remedy is effective.

MODIFICATIONS TO THE ROD

This Explanation of Significant Differences (ESD) has been prepared to document the modifications from the original ROD. However, the overall goals, as discussed above, remain unchanged.

The modifications to the original ROD are as follows:

- A passive gravity drain system will replace the proposed active leachate extraction system. This passive system will be more cost effective while achieving the same goal of managing leachate levels in the landfill to prevent leachate seeps through the cap and to reduce the potential for leachate migration from the landfill in the groundwater.
- To clarify the cap design, the 3-foot clay cap specified in the ROD performance standard will actually be 18 inches of clay, 12 inches of root zone material, and 6 inches of topsoil.
- Passive gas vents will replace the proposed active gas extraction system and tall stack. The gas vents will be more cost effective while achieving the same goal of controlling the landfill gas to reduce pressures in the landfill that can damage the landfill cap and can increase the potential for leachate migration.
- The limits of buried waste have been extended as shown in Figure 2 based on geophysical survey investigation information (May 1993).

The leachate and landfill gas modifications have the following advantages. They: 1) are easier to install, 2) have lower capital costs, 3) are easier to operate and maintain since there is no mechanical and electrical equipment such as leachate pumps and gas blowers, 4) have lower operation and maintenance costs, 5) have a more simple design which makes it easier to modify the design during construction or at some later point in time in order to meet the objectives (lateral of additional leachate drains could be easily added in the future if needed to lower the leachate level in localized areas), and 6) have a shorter timeframe for construction.

While achieving the same remedial objectives, the modified design represents an estimated capital cost savings of \$325,000 from the remedy in the previous ROD (\$756,000 versus \$1,084,400).

Affirmation of the Statutory Determinations: Considering the new information that has been developed and the changes that have been made to the selected remedy, the Environmental Protection Agency and the North Dakota State Department of Health believe that the remedy remains protective of human health and the environment, complies with Federal and State requirements that were identified in the ROD and in this ESD as applicable or relevant and appropriate to this remedial action at the time this ESD is signed, and is cost effective. In addition, the revised remedy utilizes permanent solutions and alternate treatment technology to the maximum extent practicable for this site.

Date

Signed

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Section I

Introduction

The purpose of this document is to explain the differences between the Record of Decision (ROD), signed by the EPA on June 21, 1993, and the remedy proposed herein, which will be implemented at the site.

Under Section 117 of CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and Section 300.435 (c) (2) (i) of the National Contingency Plan (NCP), EPA is required to publish an ESD when modifications from the previously selected remedy are made. This document provides a brief history of the site, describes the Remedial Action (RA), and explains the ways in which this RA differs from the remedy stated in the Old Minot Landfill Superfund Site (Site) ROD. This document will be placed in the Administrative Record file in conformance with Section 300.825 (c) (2) (i) of the NCP. The file is located and available for inspection at information repositories at the following locations:

- Minot City Hall
515 Second Avenue Southwest
Minot, North Dakota 58701
Phone: (701) 857-4752
Hours: M - F 8:00 a.m. to 4:30 p.m.

- Minot Public Library
520 Second Avenue Southwest
Minot, North Dakota 58701
Phone: (701) 852-1045
Hours: Th 9:00 a.m. to 9:00 p.m.; F - 9:00 a.m. to 6:00 p.m.;
Sa - 10:00 a.m. to 4:00 p.m.; Su - 1:00 to 5:00 p.m

- EPA Superfund Records Center
999 18th Street, Suite 500
Denver, Colorado 80202
Phone: (303) 312-6473
Hours: M - F 8:00 a.m. to 4:30 p.m.

- North Dakota State Department of Health
1200 Missouri Avenue
Bismarck, North Dakota 58506
Phone: (701) 328-5210
Hours: M - F 8:00 a.m. to 5:00 p.m.

Section II

Summary of Site History

The Site is located approximately one mile southwest of downtown Minot, in Ward County, North Dakota. It was listed on the National Priorities List (NPL) in 1989. The site is a closed waste disposal facility situated approximately 2,000 feet south of the Souris River and is located to the east of the intersection of the Burdick Expressway and the combined U.S. Highways 2 and 52 Bypass. The fill area that received municipal and industrial waste covers approximately 17 acres. Land use in the vicinity of the Site is light industrial and residential, with areas southwest of the Site used for agriculture.

The Site was used to dispose of municipal and some industrial wastes between 1961 and 1971. The landfill was operated by the City of Minot. An estimated 75 tons/day of waste were placed in the landfill during its operation. The exact composition of the wastes disposed of at the landfill is not known. Discussions with past landfill operators indicate that refuse was received from the City of Minot, other neighboring towns, farms, industries, and military sites. In addition, the landfill likely contains arsenic-contaminated soil and residues, and solvents used in a variety of local industrial applications.

Section III

Summary of Site Risks

Residential, commercial, recreational, and agricultural areas are currently located in the vicinity of the Site, and nearly a quarter (8,000) of Minot's population lies within a one-mile radius of the Site. Since the latter part of 1989, most of the Site has been enclosed with a chain-link fence and, consequently, public access to the Site is presently restricted. Future land use for the areas adjacent to the Site is expected to be commercial and light industrial.

A Baseline Risk Assessment (BRA) was prepared for the site to evaluate potential human health risks associated with the Site in the absence of any remedial action. Contaminated media that were quantitatively evaluated in the risk assessment were: groundwater (including leachate), surface water, soil, sediment, and landfill gases. Potentially exposed receptors who were evaluated in the Baseline Risk Assessment were: (1) adult residents and occupational workers who live or work at or in the vicinity of the Site, and (2) active children between the ages of 3 to 12 years who live or play in the vicinity of the Site.

In summary, the evaluation performed in the BRA was based on a hypothetical exposure of both adults and children to groundwater, surface water, surface soil, sediment, and landfill gases. The greatest potential cancer risk for adults will be from direct inhalation of landfill gases. Under this scenario, the probability for an adult to develop cancer above the national average is about 1 in 100. For a child, the excess cancer risk from landfill gases would be 1 in 5,000.

Exposure to contaminated groundwater presents the second most serious potential excess cancer to adults and the most serious excess cancer risk to children. The probability that either an adult or child will develop cancer in excess of background occurrences is about 1 in 300. Exposure of contaminated soils is observed to present a relatively lower potential cancer risk for both adults and children. Direct skin contact with contaminated sediment from leachate seeps and on-site ponds also presents a relatively low potential excess cancer risk for adults as well as children. Exposure to contaminated surface water presents the lowest potential cancer risk of the scenarios evaluated.

Based in part on the BRA, EPA has determined that actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in the ROD, as modified by this ESD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

Section IV

Summary of Community Participation Since the 1993 ROD

Since the signing of the ROD, the community has expressed limited interest in the Site. Public involvement has primarily been through monthly city council meetings.

Section V

Summary of the Remedial Design

The remedial design incorporates removal, treatment, and containment technologies with a capital cost of approximately \$756,000 to design and construct. Primary components of the remedial design include:

- institutional controls to prohibit construction on the landfill, or the use of water beneath the landfill or in the immediate vicinity of the landfill for drinking water purposes;
- leachate extraction and treatment in the City of Minot's wastewater treatment facility using a passive gravity drain system to manage leachate levels in the landfill to prevent leachate seeps through the cap and to reduce the potential for leachate migration from the landfill in the groundwater;
- consolidation of waste and contaminated soil (both from the north end of the landfill and in the vicinity of leachate seeps) under the cap, and cap improvements to limit precipitation infiltration and control stormwater run-off;
- groundwater monitoring to allow detection of future releases of contaminants to the groundwater; and
- passive landfill gas venting to control landfill gas to reduce pressures in the landfill that can damage the landfill cap and can increase the potential for leachate migration.

The application of these components for their stated objectives is technically feasible at the Site. This conclusion is based on evaluation of similar alternatives in previous studies and on engineering judgment.

Section VI

Summary of Site Activities During Remedial Action

Based on consideration of the requirements of CERCLA, the detailed analysis of alternatives, and public comments, both EPA and the State of North Dakota have determined that the remedy described herein is the most appropriate remedy for the Site in Minot, North Dakota.

The selected remedy incorporates removal, treatment, and containment technologies. Primary components of the remedy and their impact on remediation goals are discussed below.

A. INSTITUTIONAL CONTROLS

The selected remedy includes institutional controls to prohibit future land use developments at the landfill that would cause unacceptable exposure to landfill contents or gas. The institutional controls include prohibition on land use that would damage the cap and prohibition against the installation of groundwater supply wells through the landfill or in the immediate vicinity of the landfill. The institutional controls will be effective indefinitely. Implementation of institutional controls will require agreements with landowners of the landfill site as well as those adjacent to the site. This component of the remedy has not been modified from the original ROD.

B. LEACHATE EXTRACTION AND TREATMENT IN THE CITY OF MINOT'S WASTEWATER TREATMENT PLANT

Leachate will be extracted from a passive gravity drain system consisting of horizontal perforated piping buried approximately 8 feet below the ground surface. The leachate will flow by gravity to a sanitary sewer manhole located near the landfill where it will discharge to the City of Minot sewer system and be conveyed to the municipal wastewater treatment facility for treatment.

The reduction in head afforded by the extraction system will eliminate seeps and reduce leachate pressure that might cause future migration to the groundwater system. Leachate will flow continuously to maintain a leachate level below the cap.

This component of the remedy has been modified from the original ROD. The passive gravity drain replaces a system of active leachate extraction wells to be more cost effective while achieving the same goal of managing leachate levels in the landfill. Further advantages are outlined in Section VII.

C. CONSOLIDATION OF CONTAMINATED SOIL UNDER THE CAP AND CAP IMPROVEMENTS

The landfill cap will be improved in order to repair cap damage related to landfill seeps, limit precipitation infiltration, provide more effective surface water control, and comply with the substantive requirements of federal and state landfill regulations regarding final cover design. Contaminated soil and waste will be excavated from the north end of the landfill, moved within the final fill boundaries, and capped. After this material has been moved, it is the City's intention to transfer that property back to the former owner. Contaminated soil in the vicinity of landfill seeps will be consolidated in depressions in the landfill and capped. This will prevent direct contact by humans or animals with contaminated materials. It will also minimize infiltration through the contaminated soils. The contaminated soils in the vicinity of the landfill seeps are generally on the existing landfill cap; therefore, this consolidation operation can be accomplished at the same time that cap improvements are being constructed.

To clarify the cap design, the 3-foot clay cap specified in the ROD performance standard will actually be 18 inches of clay, 12 inches of root zone material, and 6 inches of topsoil. Much of the landfill is presently capped with greater than 3 feet of clay overlain by 0 to 5 feet of more permeable materials such as sand and topsoil. Thin areas of clay and areas without clay on the landfill cap will be increased to a minimum clay thickness of 18 inches. This will be done by exposing and scarifying the top surface of the existing clay and filling and compacting additional clay. Areas with less than 12 inches of root zone material will likewise be supplemented.

Major depressions on the top surface of the clay layer will be filled and compacted with additional clay to prevent ponding of precipitation and to minimize infiltration. To prevent ponding on the landfill surface, final grades will be a minimum of 3 percent. The new capping system will consist of a perimeter diversion berm or ditch which will minimize run-off outside the landfill limits from flowing onto the landfill cap, as required by federal and state ARARs. Erosion control matting will be placed where necessary to establish and maintain a vegetative cover. A vegetative cover will be established over all distributed areas including the landfill cover. Vegetative cover will be established by scarifying the surface and placing a layer of vegetative compost or topsoil as necessary to achieve a 6-inch thick organic substrate for plant growth prior to seeding. Other than clarifying the cap design, this component of the remedy has not been modified from the original ROD.

D. MONITORING

Groundwater monitoring will continue during and following implementation of the remedial action in order to document that the source control remedy is adequate over the long-term to maintain groundwater outside of the landfill at acceptable quality levels. The monitoring wells installed during the RI will be used in the long-term groundwater monitoring program. Monitoring wells installed in the landfill itself, along with previously installed gas wells, will be abandoned during implementation of the selected remedy.

The monitoring program will begin with four quarterly sampling events the first year and continue with annual sampling and analysis of the groundwater samples from the monitoring wells.

Sampling and analysis will be done for volatile organic compounds (VOCs) and inorganic and organic chemicals that have maximum contaminant levels (MCLs) cited in 40 CFR 141.11 and 12, and 40 CFR 141.60 and 61; maximum contaminant level goals (MCLGs cited in 40 CFR 141.50; or secondary maximum contaminant levels (SMCLs) cited in 40 CFR 143.03. The four quarterly sampling events will determine the baseline groundwater quality. After that, annual monitoring is recommended since the groundwater flow rate in the geologic materials in the vicinity of the landfill is low. Annual monitoring will be adequate to identify any changes in groundwater quality in the immediate vicinity of the landfill.

Routine monitoring will also be required for the leachate that is discharged to the Minot wastewater treatment facility. Monitoring requirements will include the analysis of monthly grab samples for chemical oxygen demand (COD), biochemical oxygen demand (BOD), total suspended solids, and pH, as well as the analysis of quarterly grab samples for VOCs, metals, and chemicals that have MCLs, MCLGs, or secondary maximum contaminant levels (SMCLs). One toxicity screening test will also be performed prior to initial discharge.

The required range of analytical parameters for the groundwater and leachate monitoring programs may be reviewed on an annual basis and may be modified, as appropriate and only after approval from EPA. These modifications will be based upon trends that will be established from the accumulated results of the previous sampling events.

This component of the remedy has not been modified from the original ROD.

E. PASSIVE LANDFILL GAS VENTING

A passive landfill gas venting system will be installed in conjunction with the gravity leachate drain system. Vent pipes extending above the landfill will allow gas to vent to the atmosphere. Wind vanes installed on the ends of the vents will assist in relieving pressure under the cap by creating negative pressures in the collection piping.

This component of the remedy has been modified from the original ROD. The passive gas venting system replaces a system of active gas extraction wells with a tall dispersion stack. The passive system will be more cost effective while achieving the same goal of managing landfill gas. Further advantages are outlined in Section VII.

SECTION VII Conclusion

The EPA is committed to long-term solutions by either eliminating or reducing to safe levels the threat posed by the contaminants found at the Site. The remedial design incorporating removal, treatment, and containment technologies meets these objectives.

This ESD has been prepared to document the modifications from the original ROD. However, the overall goals remain unchanged. The goals include: (1) the landfill must have a cap that is adequate to prevent direct contact by receptors with the waste or leachate; (2) the leachate levels in the landfill must be managed to prevent leachate seeps through the cap and to reduce the potential for leachate migration from the landfill in the groundwater; (3) the landfill gas must be controlled to reduce pressures in the landfill that can damage the landfill cap and can increase the potential for leachate migration; (4) institutional controls must be implemented to prohibit any human activity on the landfill that would expose receptors to refuse or leachate, or that would damage the containment system; and (5) groundwater in the vicinity of the landfill must be sampled and analyzed at regular intervals to demonstrate that the selected remedy is effective.

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- To clarify the cap design, the 3-foot clay cap specified in the ROD performance standard will actually be 18 inches of clay, 12 inches of root zone material, and 6 inches of topsoil.
- Passive gas vents will replace the proposed active leachate extraction system and tall stack to be more cost effective while achieving the same goal of controlling the landfill gas to reduce pressures in the landfill that can damage the landfill cap and can increase the potential for leachate migration.
- The limits of buried waste have been extended as shown in Figure 2 based on geophysical survey investigation information (May 1993).

The leachate and landfill gas modification have the following advantages. They: 1) are easier to install, 2) have lower capital costs, 3) are easier to operate and maintain since there is no mechanical and electrical equipment such as leachate pumps and gas blowers, 4) have lower operations and maintenance costs, 5) have a more simple design which makes it easier to modify the design during construction or at some later point in time in order to meet the objectives (e.g., lateral or additional leachate drains could be easily added in the future if needed to lower the leachate level in localized areas), and 6) have a shorter time-frame for construction.

While achieving the same remedial objectives, the modified design represents an estimated capital cost savings of \$325,000 from the remedy in the previous ROD (\$756,000 versus \$1,084,400).

Glossary

Baseline Risk Assessment (BRA): Data collection and evaluation, exposure assessment, toxicity assessment, and risk characterization.

Carcinogen: A cancer-causing substance

Groundwater: Water found beneath the earth's surface that supplies wells and springs

In-Situ: Something that is situated in its original or natural place or position

National Priorities List (NPL): EPA's list of top-priority hazardous substance sites that are eligible for investigation and cleanup under the Federal Superfund program.

Passive Gas Venting: A system for allowing gases which are generated in a landfill to vent to the atmosphere. Typically, this system consists of a network of perforated piping installed beneath the landfill cover soils.

Record of Decision (ROD): A public document that explains which cleanup alternatives will be used at a Superfund site. The Record of Decision is based on information and technical analysis generated during the Remedial Investigation/Feasibility Study and consideration of public comments and community concerns.

Remedial Investigation/Feasibility Study (RI/FS): Two distinct but related studies. During the Remedial Investigation, the types, amounts, and locations of contamination at a site are identified. In the Feasibility Study, alternatives for cleaning up the contamination are identified, screened, and compared before a cleanup method is chosen.

Volatile Organic Compound (VOC): An organic compound that volatilizes (turns into a gas) readily at moderate temperatures.

Figures

